Review of Accuracy Scenario Generation & Refresh Analysis

FAA William J. Hughes Technical Center

ACT-250

Conflict Probe Assessment Team (CPAT)

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May 16, 2001

Overview of Briefing

- Motivation of CPAT Accuracy Task
- Description of What Delivered
- Review of Tool Methodology

- Scenario Generation (Oaks)
- Accuracy Refresh Processes
  - Introduction / Trajectory Accuracy (Paglione)
  - Flight Sample (Ryan)
  - Scenario Characteristics (Summerill)

Motivation for the Task

- FAA Free Flight Phase 1 Program Office contracted Lockheed Martin (LM) to build URET CCLD
  - FFP1 Program Office (AOZ-200) wrote System Specification Document (SSD) for URET CCLD
  - FFP1 Program Office tasked ACT-250 to
    - ✓ Develop realistic traffic scenarios with specified characteristics (e.g. significant quantity of aircraft to aircraft / airspace encounters) for testing the ***accuracy*** of URET CCLD against refreshed SSD requirements
    - ✓ Using above scenarios, perform ***accuracy*** testing of MITRE developed URET DU for AOZ-200 SSD refresh

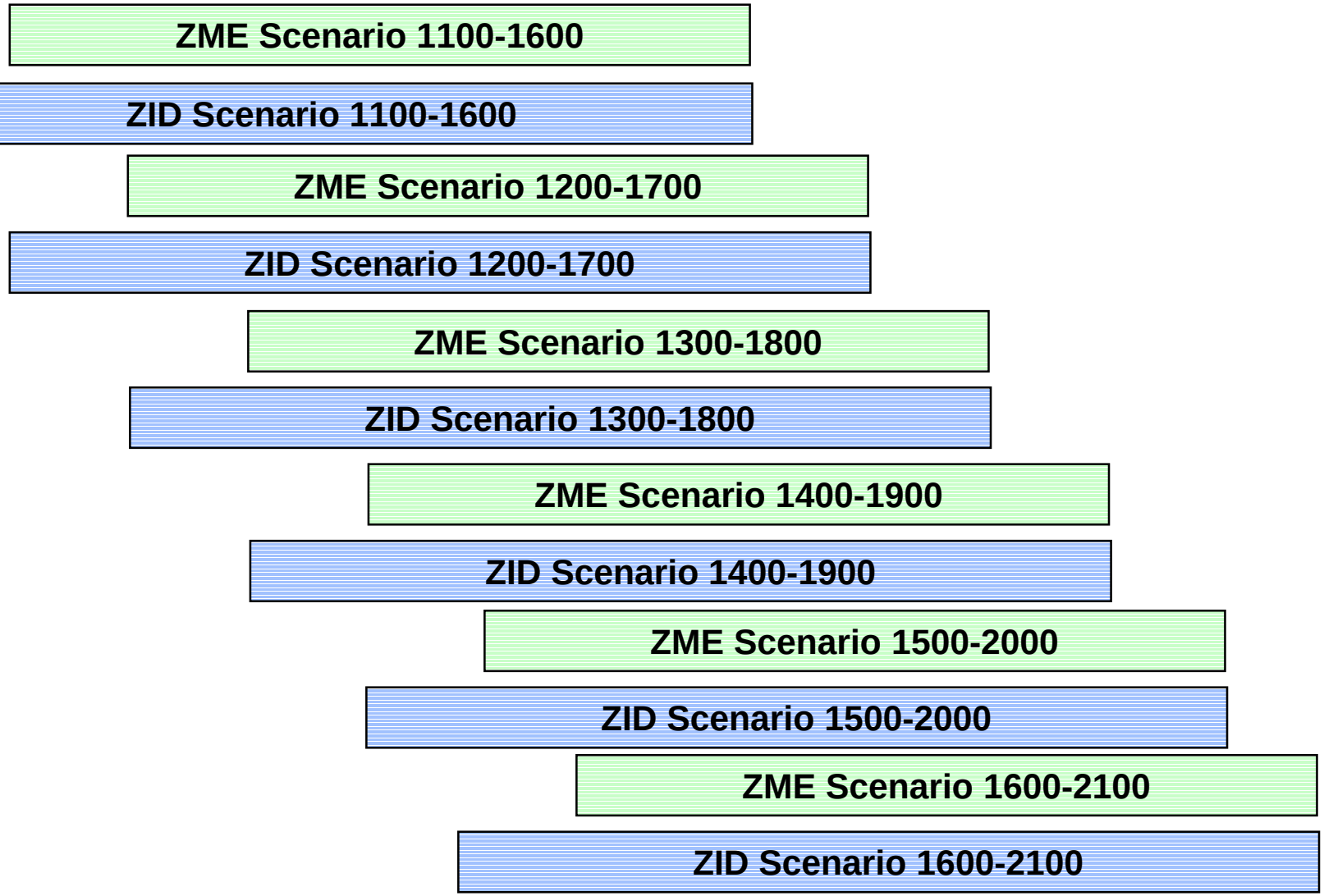
URET CCLD Accuracy Test

- URET CCLD Accuracy Requirements:
  - Altitude modeling
  - Warning Time
  - Predicted Conflict Start Time
  - Current Plan Aircraft-Aircraft Missed Conflict Notification Rates
  - Current Plan Aircraft-Aircraft False Conflict Notification Rates
  - Current Plan Aircraft-Airspace Missed Conflict Notification Rates
  - Current Plan Aircraft-Airspace False Conflict Notification Rates
  - Trial Plan Aircraft-Aircraft Missed Conflict Notification Rates
  - Trial Plan Aircraft-Aircraft False Conflict Notification Rates
  - Trial Plan Aircraft-Airspace Missed Conflict Notification Rates
  - Trial Plan Aircraft-Airspace False Conflict Notification Rates
- Accuracy Test consists of four runs:
  - Current plan single site
  - Current plan dual site
  - Trial plan single site
  - Trial plan dual site

Final Delivery Scenario Data

- Includes 7 Scenarios each for ZME & ZID
  - One 1 hour scenario for format validation
  - Six 5 hour scenarios for accuracy testing
  - Organized in 7 corresponding sub-directories
    (e.g. Run1100_1200_data)
- Scenario Files Provided as:
  - CMS
    - ✓ ASCII file (defined by ACT-250)
    - ✓ binary file (defined in CMS IRD)
  - P320 ASCII file (a.k.a. MITRE's SCN format)
- Copy of PTR Web Page at Delivery Date

How Final Delivery Extracted



Time line of raw HCS data from 5/26/99 in UTC

Final Delivery IFA Cumulative Aircraft-to-Aircraft Encounter Counts

Table 1: Total Count of Current Plan Aircraft Encounters*

Minimum Horizontal Separation (nm)	Without Adherence	Adherence Age >= 13 Minutes
0 <= d < 5	927	598
5 <= d < 10	1175	693
10 <= d < 15	1460	851
15 <= d < 23	2977	1764
23 <= d < 30	2545	1527
Total	9084	5433

Table 2: Total Count of Trial Plan Aircraft Encounters*

Minimum Horizontal Separation (nm)	Without Adherence	Adherence Age >= 20 minutes
0 <= d < 5	927	565
5 <= d < 10	1175	664
10 <= d < 15	1460	802
15 <= d < 24	2977	1888
24 <= d < 30	2545	1248
Total	9084	5167

*NOTE: Required 506 bin count with adherence columns.

Final Delivery IFA Cumulative Aircraft-to-Airspace Encounter Counts

Table 3: Total Count of Current Plan Airspace Encounters by Horizontal Separation*

Minimum Horizontal Separation (nm)	Without Adherence	Adherence Age >= 13 minutes
Conflicts [1]	13852	11883
d = 0 [2]	223	185
0 < d < 7	5055	4051
7 <= d < 9	1354	1034
9 <= d < 11	1218	925
11 <= d < 16	3235	2556
16 <= d < 30	11089	8754
Total	36026	29388

*NOTE: Requires the 506 bin count with adherence

Final Delivery IFA Cumulative Aircraft-to-Airspace Encounter Counts

Table 4: Total Count of Trial Plan Airspace Encounters by Horizontal Separation*

Minimum Horizontal Separation (nm)	Without Adherence	Adherence Age >= 20 minutes
Conflicts [1]	13852	11628
d = 0 [2]	223	180
0 < d < 8	5760	4513
8 <= d < 11	1867	1406
11 <= d < 13	1183	902
13 <= d < 19	4391	3469
19 <= d < 30	8750	6640
Total	36026	28738

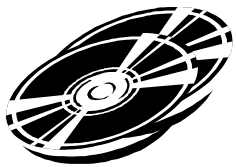
*NOTE: Requires the 506 bin count with adherence

Final Delivery Refresh Data

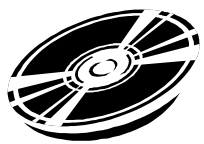
- Main Contents in 3 Sub-Directories:
  - Scenario Characteristics
    - ✓ One report for each of the 6 scenarios
    - ✓ Summary report for cumulative encounter counts
  - Trajectory Accuracy
    - ✓ Using URET DU D32R2 baseline
    - ✓ 10 Trajectory Accuracy Tables for Each ZME Run*
  - Aircraft-to-Aircraft & Aircraft-to-Airspace Encounter Lists
- Relevant Documents and Presentations

***Performed trajectory accuracy using no new rules (all error is counted) and then repeated with CCLD Rules included (excludes some of the errors).**

Final Delivery Inventory (external)



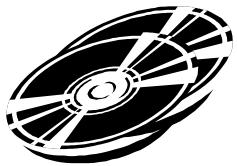
Scenario Data 1 of 2 and 2 of 2, Rev E*

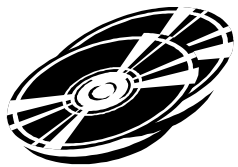


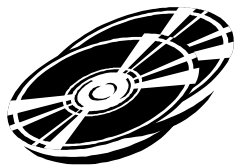
Refresh Data, Rev 1

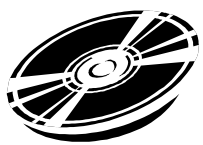
* PTR List provided on internet site, act250.tc.faa.gov

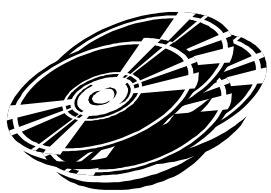
Final Delivery Inventory (internal)


Supplemental Data 1of2 & 2of2


DRA Oracle Tables IFA & Single


DRA Misc Files IFA & Single


Misc Data


DLOG Files, IFA&Single, CP&TP

Methodology